

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2000-276258

(43)Date of publication of application : 06.10.2000

(51)Int.Cl. G06F 1/18
G06F 3/00

(21)Application number : 11-085728

(71)Applicant : NEC NIGATA LTD

(22)Date of filing : 29.03.1999

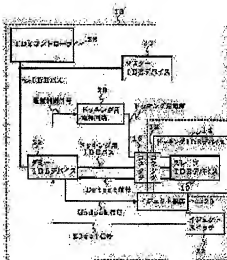
(72)Inventor : HAYAKAWA MORIHITO

(54) DEVICE AND METHOD FOR INSERTING/EJECTING IDE DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a device and a method for inserting/ejecting integrated device electronics(IDE) devices with which system failure does not occurs in the main body of a computer by a dummy circuit when performing hot-line insertion/ejection.

SOLUTION: At the time of hot-docking a docking IDE device 14, a dummy IDE device 22 performs initial setting in place of an IDE controller so as to operate the docking IDE device 14 and in the case of hot-undocking, issues a head saving command or the like so as to prevent data destruction in the docking IDE device 14 and executes an operation such as making the impedance of an IDE bus for docking and a power source 20 for docking high. The IDE device (DVD, CD-ROM drive or HDD) not supporting hot-docking/hot-undocking can also be hot-docked/hot-undocked as well.



Family list**2** family member for: **JP2000276258**

Derived from 1 application

[Back to JP2000276](#)**1 DEVICE AND METHOD FOR INSERTING/EJECTING IDE DEVICE****Inventor:** HAYAKAWA MORIHIITO**Applicant:** NEC NIIGATA LTD**EC:****IPC:** *G06F1/18; G06F3/00; G06F1/18* (+3)**Publication info:** **JP3389878B2 B2** - 2003-03-24**JP2000276258 A** - 2000-10-06Data supplied from the *esp@cenet* database - Worldwide

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開2000-276258

(P2000-276258A)

(43) 公開日 平成12年10月6日 (2000. 10. 6)

(51) Int. Cl. ⁷	識別番号	F I	ページノット (参考)
G 0 6 F 1/18		C 0 6 F 1/00	3 2 0 H
3/00		3/00	B

審査請求 有 請求項の数 8 O L (全 11 頁)

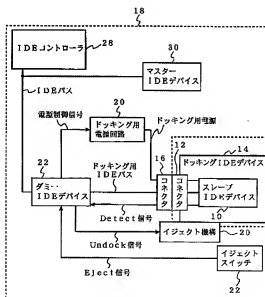
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(54) 【発明の名称】 IDEデバイス挿抜装置および方法

(57) 【要約】

【課題】 活線挿抜をおこなうときに、コンピュータ本体にダミー回路によりシステムダウンをさせないIDEデバイス挿抜装置および方法を提供する。

【解決手段】 ダミーIDEデバイス22は、ドッキングIDEデバイス14が、ホットドックされたとき、ドッキングIDEデバイス14が動作可能になるようにIDEコントローラの代わりに初期設定をおこない、ホットアンドックの際には、ドッキングIDEデバイス14の持つデータが、破壊されないように、ヘッド退避コマンドなどを発行し、ドッキング用IDEバスとドッキング用電源20をハイ・インピーダンスにするなどの動作を実行する。ホットドック・ホットアンドックをサポートしていないIDEデバイス (DVD, CD-ROMドライブ, HDDなど) もホットドック・ホットアンドックできる。



【特許請求の範囲】

【請求項1】処理装置および／または記憶装置を有するデバイスと、前記デバイスを装置へ接続するための第1のコネクタとを有するドッキングIDEデバイスと、前記ドッキングIDEデバイスの第1のコネクタを介して接続するための第2のコネクタとを有し、前記ドッキングIDEデバイスの有無を検知し、前記ドッキングIDEデバイスが接続されているとき電源を供給し、マスター・スレーブ接続するバスに前記ドッキングIDEデバイスを接続し、指示により前記ドッキングIDEデバイスを取り外すと制御系へあたかも前記ドッキングIDEデバイスがあるかのようなゲームの信号を出力する情報処理装置と、を備えることを特徴とするIDEデバイス挿抜装置。

【請求項2】前記情報処理装置は、前記ドッキングIDEデバイスが接続されると電源供給の信号により、電源を供給または停止するドッキング用電源回路と、

前記ドッキングIDEデバイスの取り外しの指示を受けると、取り外しの信号を出力し、取り外し許可の信号を取得すると前記第2のコネクタから前記第1のコネクタをはずすジェクト手段と、

前記ドッキングIDEデバイスの接続を検知し、接続しているとき前記電源供給の信号を出力し、前記ドッキングIDEデバイスとIDEバスとをマスター・スレーブ接続し、前記ジェクト手段から前記取り外しの信号が入力されると、前記ドッキングIDEデバイスとIDEバスとを切断し、前記電源供給の信号を出力し電源を停止し、前記取り外し許可信号を出力し、前記ドッキング用電源回路と前記ドッキングIDEデバイス側のIDEバスをハイ・インピーダンス状態に保つゲームIDEデバイスと、を有することを特徴とする請求項1記載のIDEデバイス挿抜装置。

【請求項3】前記ドッキングIDEデバイスは、ハードディスク、CD-ROM、バッファおよび制御回路であることを特徴とする請求項1または2記載のIDEデバイス挿抜装置。

【請求項4】前記ゲームIDEデバイスは、前記ドッキングIDEデバイス側のIDEバスと前記ゲームIDEデバイスの第1の内部バスとを第1のスイッチ信号によりスイッチングする第1のスイッチと、前記第1の内部バスと前記IDEバスとを第2のスイッチ信号によりスイッチングする第2のスイッチと、前記第1の内部バスと第2の内部バスとを第3のスイッチ信号によりスイッチングする第3のスイッチと、前記第1、第2、第3のスイッチ信号を出力し、前記ドッキングIDEデバイスの接続の有無を検知する信号を入力し、前記ドッキングIDEデバイスの個別情報を格納し、前記取り外しの信号を入力し、前記電源供給の信号と前記取り外し許可の信号を出力するレジスタおよび

制御回路部と、を有することを特徴とする請求項2記載のIDEデバイス挿抜装置。

【請求項5】前記ドッキングIDEデバイスに格納される前記デバイスが少なくともデバイス自身の前記個別情報を持たないデバイスであるとき、前記ドッキングIDEデバイスに前記個別情報を格納する記憶手段をさらに有することを特徴とする請求項4記載のIDEデバイス挿抜装置。

【請求項6】前記個別情報は、種類、名称およびベンダー名であることを特徴とする請求項4または5記載のIDEデバイス挿抜装置。

【請求項7】前記情報処理装置と前記ドッキングIDEデバイスとをマスター・スレーブ接続することによりバスに複数接続することを特徴とする請求項1から5まで記載のIDEデバイス挿抜装置。

【請求項8】処理装置および方法および／または記憶装置および方法を、格納するデバイスとを有するドッキングIDEデバイスと、

前記ドッキングIDEデバイスを接続し、前記ドッキングIDEデバイスへの電源の供給源と、制御系につながるバスとを有する情報処理装置とを備えるIDEデバイス挿抜装置におけるIDEデバイス挿抜方法であって、前記ドッキングIDEデバイスの有無を検知し、前記ドッキングIDEデバイスが接続されているとき電源を供給し、前記バスにマスター・スレーブ接続する前記ドッキングIDEデバイスを接続し、指示により前記ドッキングIDEデバイスを取り外すと前記制御系へあたかも前記ドッキングIDEデバイスがあるかのようなゲームの信号を出力することを特徴とするIDEデバイス挿抜方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、IDEデバイスの活接挿抜するときに、ゲーム回路を備えることによりコンピュータ本体をダウンさせないIDEデバイス挿抜装置および方法に関する。

【0002】

【従来の技術】IDE (Integrated Device Electronics) デバイスの挿抜方法は、特にノートブックタイプのパーソナルコンピュータに用いられている。電源を落とさなくともIDEデバイスに限らずデバイスを挿抜することは、デバイスに過電流が流れるなどしてデバイス自体の破壊につながるということがあった。

【0003】そこでこの問題を解決するために従来のデバイスの挿抜方法の一例が、特開平10-187304号公報に記載されている。この公報に記載されたコンピュータシステムおよびそのシステムにおける周辺デバイスの挿抜制御方法は、図9に示すようにコンピュータ本体と、ドッキングステーションと、コンピュータ本体とドッキングステーションとを接続するドッキングコネク

タとを備える。

【0004】コンピュータ本体は、CPU、主メモリがホスト/PCIブリッジを介して接続されているPCIバスとISA (Industry Standard Architecture) バスに接続し、Detect信号を受信することでセレクトラブルベイが接続されたことを認知し制御コントローラへ通知し、Eject信号を受信するとセレクトラブルベイが取り外されることを認識し制御コントローラへ通知する内部PCI-ISAブリッジ装置と、ISAバスとコネクタを介してセレクトラブルベイとを制御コントローラからのスイッチ制御によりスイッチングするスイッチと、内部PCI-ISAブリッジ装置からの通知などによりスイッチのスイッチ制御をおこなう制御コントローラと、HDDまたはCD-ROMなどで構成しコネクタを介してコンピュータ本体と接続するセレクトラブルベイと、セレクトラブルベイを取り外すときに押下されることによりEject信号を内部PCI-ISAブリッジ装置へ出力し、取り外す信号を受け取るとセレクトラブルベイがコネクタからはずれるイジェクトとを備える。

【0005】特開平10-187304に開示されているデバイスの挿抜方法は、HDD/CD-ROMが、ホットドック・ホットアンドドックの際に壊れたり、あるいは、ISAバス、IDE/IF制御線の信号線の乱れによってシステムがストップしたりする不具合を回避している。

【0006】また、従来のデバイスの挿抜時の不良アクセスを検出してバックアップする活線挿抜方法の一例が、特開平9-311742号公報に記載されている。この公報に記載された情報処理装置およびその活線挿抜方法は、情報処理部、記憶部などの回路を有するプリント板と、複数のプリント板が接続しリードまたはライトアクセスするシステムバスとを備える情報処理装置におけるプリント板をシステムバスから挿抜する合戦挿抜方法であって、所定のプリント板に不正アクセスを監視する不正アクセス監視回路と、不正アクセスの検出時にアクセスサイクルをリトライさせるダミートライ回路とをさらに有する。これにより、情報処理装置は、アクセス中にプリント板が挿抜されても誤ったデータの書き込みが無く誤作動が起らない。さらにこの情報処理装置は、プリント板の挿入時にシステムバスに出力する信号の出力端がハイインピーダンスとなる。

【0007】

【発明が解決しようとする課題】特開平10-187304号公報に記載のコンピュータシステムおよびそのシステムにおける周辺デバイスの挿抜制御方法は、ホットドックの後、HDDまたはCD-ROMなどのIDEデバイスが、正常に動作するために、ソフトウェアドライバによりHDD/CD-ROMに對して、初期設定などを行わなければならない。ソフトウェアドライバによるホ

ットドック・ホットアンドドック処理は、例えばOSの違い、CD-ROMドライブの種類の違いなどにより、正常動作しないケースもある。その場合には、さまざまなOSに対応した、または、さまざまなデバイスの種類にあわせたソフトウェアドライバを作成しなければならないという不都合が生じる。

【0008】また、特開平9-311742号公報に記載の情報処理装置およびその活線挿抜方法は、プリント板がリード、ライトが終了するまで挿抜することができないことにある。このとき挿抜することは、情報処理装置の不具合を生じさせることになる。さらに取り外したまま電源のオン、オフをおこなうと情報処理装置は、例えば取り外したプリント板があるものと扱われるが該当の信号が帰らないなどすることにより装置に不具合を生じさせることもある。

【0009】本発明の目的は、デバイスを活線から挿抜すること、ダミー回路を備えることによりコンピュータ本体のシステムダウンを防止するIDEデバイス挿抜装置および方法を提供することにある。

【0010】

【課題を解決するための手段】本発明のIDEデバイス挿抜装置は、処理装置および方法およびまたは記憶装置および方法と、格納するデバイスと、装置へ接続するための第1のコネクタとを有するドッキングデバイスと、前記ドッキングデバイスの第1のコネクタを介して接続するための第2のコネクタとを有し、前記ドッキングデバイスの有無を検知し、前記ドッキングデバイスが接続されているとき電源を供給し、マスタ・スレーブ接続するバスに前記ドッキングデバイスを接続し、指示により前記ドッキングデバイスを取り外すと制御系へあたかも前記ドッキングデバイスがあるかのようなダミーの信号を出力する情報処理装置とを備えることを特徴とする。

【0011】本発明のIDEデバイス挿抜方法は、処理装置および方法およびまたは記憶装置および方法と、格納するデバイスとを有するドッキングIDEデバイスと前記ドッキングIDEデバイスを接続し、前記ドッキングIDEデバイスへの電源の供給源と、制御系につながるバスとを有する情報処理装置とを備えるIDEデバイス挿抜装置におけるIDEデバイス挿抜方法であって、前記ドッキングデバイスの有無を検知し、前記ドッキングIDEデバイスが接続されているとき電源を供給し、前記バスにマスタ・スレーブ接続する前記ドッキングIDEデバイスを接続し、指示により前記ドッキングIDEデバイスを取り外すと前記制御系へあたかも前記ドッキングIDEデバイスがあるかのようなダミーの信号を出力することを特徴とする。

【0012】

【発明の実施の形態】本発明は、パーソナルコンピュータにおけるIDEインタフェース上にダミーIDEデバ

イスを設けたことにより、ホットドック・ホットアンドドックと称される活線挿抜をサポートしていないパーソナルコンピュータの周辺デバイスに対してはホットドック・ホットアンドドックが可能になることを特徴としている。

【0013】本発明の実施例の構成を図1を参照し詳細に説明する。図1は、本発明のIDEデバイス挿抜装置の構成を表すブロック図である。DVD、ハードディスクドライブおよびCD-ROMドライブなどのスレープIDEデバイス10と、スレープIDEデバイスと接続され外部装置とデータを取り取りするための入出力端子であるコネクタ12とを有し外部装置へ挿抜するための装置であるドッキングIDEデバイス14と、ドッキングIDEデバイス14へ電源を供給し、コネクタ12と接続可能なコネクタ16を有し、コネクタ12とコネクタ16とが接続することにより、指示によりドッキングIDEデバイス14へ電源を供給し、スレープIDEデバイス10が他のデバイスと同様の動作が可能となるようにバスを接続し、ユーザからの指示によりドッキングIDEデバイス14を切り離すとき、電源供給を停止し、システムが停止しないようにバスなどを假想的に、何らかのデバイスが接続されているような状態にする情報処理装置18とを備える。

【0014】情報処理装置18は、指示によりドッキングIDEデバイス14に電源を供給するドッキング用電源回路20と、コネクタ12、16を介して送られてくるDetect信号の変化によりドッキングIDEデバイス14が接続されたことを検知し、検知によりドッキング用電源回路20に電源供給開始の指示を送信し、マスター・スレープ接続するためのIDEバスと、コネクタ12、16を介してスレープIDEデバイス10とのデータの通信路であるドッキング用IDEバスとを接続し、Eject信号の変化を検知するとUndock信号を出し、ドッキング用電源回路20へ電源供給の停止を指示し、IDEバスとドッキング用IDEバスとを断し、ドッキング用電源回路20とドッキング用IDEバスとをハイインピーダンス状態にするゲームーIDEデバイス22と、ユーザがオンすることによりEject信号が変化し、ゲームーIDEデバイス22へ通知されるイジェクトスイッチ24と、ゲームーIDEデバイス22からのUndock信号により内蔵されているモータまたはバネによりドッキングIDEデバイス14をコネクタからはずすイジェクト機構26とを有する。

【0015】さらに情報処理装置18は、IDEバスに、装置全体を制御しさらにバスによりCPUなどに接続するIDEコントローラ28と、DVD、ハードディスクドライブおよびCD-ROMドライブなどのマスターIDEデバイス30とを接続する。

【0016】ゲームーIDEデバイス22は、IDEコントローラ28とドッキングIDEデバイス14の間のI

DEバス上に位置する。通常IDEデバイスは、バス上にマスター・スレープ接続されることにより、一つのバスで、2台まで接続可能である。本実施例では、スレープIDEデバイス10を内蔵した、ドッキングIDEデバイス14へつながるバス上にゲームーIDEデバイス22を配置して、IDEバスとドッキングIDEバスを切り離している。これにより、ドッキングIDEデバイス14が、ホットドックもしくはホットアンドドックされても、IDEバスの信号の波形には影響がなく、マスターIDEデバイス30に悪影響を与えることはない。

【0017】ゲームーIDEデバイス22は、Detect信号の状態で、ドッキングIDEデバイス14が接続されているかどうかを判断する。ゲームーIDEデバイス22は、ドッキングIDEデバイス14がドッキングされていない場合、ドッキングIDEデバイス14の代わりにIDEコントローラ28と通信をおこない、IDEコントローラ28に対してはあたかもドッキングIDEデバイス14があるように見せる。実際にドッキングIDEデバイス22にアクセスがあった場合は、データ転送などの動作が出来ないことをIDEコントローラ28に通知し、システムをハングアップさせないように動作する。また、Detect信号は、スレープIDEデバイス10の種類、名称などの情報をシリアルで含む。

【0018】ゲームーIDEデバイス22は、ドッキングIDEデバイス14が、接続されていない場合は、ドッキング用IDEバスとドッキング用電源をハイ・インピーダンスに保ち、ホットドックの瞬間に過電流が流れ、ドッキングIDEデバイス14にダメージを与えないようにしておく。ドッキング用電源は、ドッキング用電源回路20により作られ、電源ON/OFFの動作はゲームーIDEデバイス22からの電源制御信号により制御される。

【0019】ドッキングIDEデバイス14が、ホットドックされた場合、ゲームーIDEデバイス22は、Detect信号の変化により、ドッキングIDEデバイス14が接続されたことを認識し、ドッキング用電源をONにし、ドッキング用IDEバスを使用可能状態にする。ゲームーIDEデバイス22は、ドッキングIDEデバイス14にリセットをかけ、あらかじめ、ゲームーIDEデバイス22内に保存しておいたドッキングIDEデバイス14用の初期設定値をドッキングIDEデバイス14へ書き込み、動作可能にする。その後、IDEコントローラ28が、ドッキングIDEデバイス14に、アクセスしていないタイミングで、IDEバスとドッキング用IDEバスを接続する。この一連の動作で、IDEコントローラ28は、ドッキングIDEデバイス14をコントロール可能とする。

【0020】ドッキングIDEデバイス14がホットアンドドックされる場合は、まずユーザにより、イジェクトスイッチ24が押され、Eject信号が変化する。ド

ミーIDEデバイス22は、ドッキングIDEデバイス14とIDEコントローラ28の間のアクセスのないタイミングで、IDEバスとドッキング用IDEバスを切り離す。その後、ダミーIDEデバイス22は、ドッキングIDEデバイス14に対して、ヘッド退避コマンドなどを発行した後、ドッキング用IDEバスとドッキング用電源をハイ・インピーダンスにする。その後、ダミーIDEデバイス22は、Undock信号により、イジェクト機構26にドッキングIDEデバイス14を取り外すよう通知する。イジェクト機構26は、内部のモータなどにより、コネクタ16から、ドッキングIDEデバイス22上のコネクタ12をはずす。

【0021】ここでイジェクト機構については、モータなどを用いてもよいし、バネなどでもよい。また、LEDを光らせるか、ブザーを鳴らして、ユーザに取り外してもいいことを通知して、ユーザが手動でドッキングIDEデバイスを取り外せるようにしてもよい。

【0022】次に、ダミーIDEデバイスの構成を図2を参照して詳細に説明する。図2は、本発明のダミーIDEデバイスの構成を表すブロック図である。ダミーIDEデバイス22は、ドッキング用IDEバスとダミーIDEデバイス22との入出力をスイッチ信号によりスイッチングをおこなうスイッチ32と、スイッチ32からの内部バスとIDEコントローラ28へのIDEバスとの入出力をスイッチ信号によりスイッチングをおこなうスイッチ34と、スイッチ32とスイッチ34とにより内部バスで接続しスイッチ信号によりレジスタおよび制御系へ内部バスでの入出力をスイッチ信号でスイッチングするスイッチ36と、スイッチ36からの内部バスを接続し、Detect信号とEject信号とを入力し、いずれの信号の変化に応じて電源制御信号とUndock信号とを出力し、スイッチ32、34、36へスイッチ信号を出力しスイッチングするレジスタおよび制御回路部38とを有する。

【0023】レジスタおよび制御回路部38は、上述したようにスイッチ32、34、36を制御する他に、Detect信号、Eject信号の状態により、電源制御信号、Undock信号を生成する。レジスタおよび制御回路部38は、ドッキングIDEデバイス14用の設定値を保存し、IDEコントローラ28に代わって、ドッキングIDEデバイス14のホットドック直後に初期設定をする。さらにレジスタおよび制御回路部38は、ドッキングIDEデバイス14が実装されていない場合に、ドッキングIDEデバイス14に代わってIDEコントローラ28との通信をおこなう機能を有している。

【0024】次に、本発明の実施例の動作の説明図3から図5を参照して詳細に説明する。図3は、本発明のIDEデバイス構成の動作のフローチャートを表す図その1である。図4は、本発明の本発明のIDEデバイス

挿抜装置の動作のフローチャートを表す図その2である。図5は、本発明の本発明のIDEデバイス挿抜装置の動作のフローチャートを表す図その3である。

【0025】IDEデバイス挿抜装置は、装置電源をONされるとONを認知し立ち上げをおこなう。ダミーIDEデバイス22は、ドッキングIDEデバイス14の有無をDetect信号により判断する(ステップA1)。Detect信号は、ドッキングIDEデバイス14が実装されている場合には0Vを示し、実装されていない場合には5Vを示すように電位が変化するようにになっている。

【0026】ステップA1の判断の結果、ダミーIDEデバイス22が、ドッキングIDEデバイス14を無しと認識した場合、ドッキングIDEバスをハイ・インピーダンス状態に保つ(ステップA2)。続いてダミーIDEデバイス22は、ドッキング用電源20をハイ・インピーダンス状態に保つ(ステップA3)。ハイ・インピーダンス状態に保つことは、ドッキングIDEデバイス14が、ホットドックされた瞬間に過電流が流れ、ドッキングIDEデバイス14内部の回路部品が破壊されることがないようにするためである。

【0027】次に、ダミーIDEデバイス22は、マスターIDEデバイス30にドッキングIDEデバイス14内のスレーブIDEデバイス10が接続されていることを通知する(ステップA4)。これは、IDEバス上でマスター・スレーブ接続された2つのIDEデバイス間でおこなわれる必要な処理である。実際は、ドッキングIDEデバイス14は、接続されていないので、ダミーIDEデバイス22が、スレーブIDEデバイス10に代わって上述の動作をおこなう。また、スレーブIDEデバイス10が、IDEコントローラ28に出力する情報として、IDEデバイスの種類(CD-ROMドライブ、ハードディスクドライブなど)、名称、ベンダー名などがある。これらの情報は、あらかじめダミーIDEデバイス内に保存しておく。

【0028】そして、スレーブIDEデバイス10が実装されていない場合は、スレーブIDEデバイス10に代わって、ダミーIDEデバイス22が、これらの情報をIDEコントローラ28へ出力する(ステップA5)。この動作は、OSがブートした後、ソフトウェアドライバの組み込みを可能にするために必要である。また、ダミーIDEデバイス22は、IDEコントローラ1によるスレーブIDEデバイス10用の設定値をダミーIDEデバイス22内のレジスタおよび制御回路部38のレジスタへ書き込んでおく(ステップA6)。設定値とは、スレーブIDEデバイス10がハードディスクドライブだった場合、PIO転送モード設定、DMA転送モード設定、スタンバイタイマー設定などである。これらの設定値をダミーIDEデバイス22内のレジスタに書き込んでおき、ドッキングIDEデバイス14のホ

ットドックがあった場合に、IDEコントローラ28に代わってスレーブIDEデバイス10に書き込む動作に備える。

【0029】以上で、ドッキングIDEデバイス22が実装されていない場合の装置電源ONから、初期設定までのフローは終了である（ステップA7）。

【0030】もし、ユーザが誤ってドッキングIDEデバイス14が実装されていないのに聞わず、ドッキングIDEデバイス14にファイル転送などのアクセスを行った場合には、ゲームIDEデバイス14が応答し、デバイスから何も応答がなかったことにより、システムが停止するというような不具合を起こさないようにする。

【0031】ドッキングIDEデバイス14が、装置電源ONの前に実装されていた場合には、ゲームIDEデバイス22は、ドッキング用電源20をONにし、IDEバスとドッキング用IDEバスを接続する。これにより、IDEコントローラ28とドッキングIDEデバイス14は、通常のアクセスが可能になる。また、ゲームIDEデバイス22は、ドッキングIDEデバイス14用の設定値と同じ値をレジスタ内に保存しておく。この設定値は、ユーザが、ドッキングIDEデバイス14をホットアンドック後にもう一度ホットドックする場合など、何回もホットドック・ホットアンドックを繰り返すという場合に必要になるため、常にゲームIDEデバイス22内に保存しておく。

【0032】次に、図4のフローチャートを用いて、ホットドックについて説明する。ゲームIDEデバイス22は、Detect信号の変化でドッキングIDEデバイス14がホットドックされたことを認識する（ステップA8）。ゲームIDEデバイス22は、IDEコントローラ28が、ゲームIDEデバイス22にアクセスしていないことを確認後、IDEバスから自身を切り離し、ドッキング用IDEバスに接続する（ステップA9）。ゲームIDEデバイス22は、電源制御信号により、ドッキング用電源20をONする（ステップA10）。ゲームIDEデバイス22は、ドッキングIDEデバイス14にリセットをかけ、あらかじめレジスタに保存しておいた設定値をドッキングIDEデバイス14へ書き込む（ステップA11）。その後、IDEバスとドッキング用バスとを接続し（ステップA12）、ドッキングIDEデバイス14が動作可能になり、ホットドックが終了する。

【0033】次に図5のフローチャートを用いて、ホットアンドックについて説明する。ユーザにより、イジェクトスイッチ24が押されると（ステップA17）、ゲームIDEデバイス22は、Eject信号の変化を受け、ドッキングIDEデバイス14に対して、ホットアンドック処理を始める（ステップA18）。ゲームIDEデバイス22は、IDEコントローラ28がドッキング

IDEデバイス14にアクセスしていないのを確認してから、ドッキングIDEデバイス14にヘッド退避コマンドなどを発行する（ステップA19）。その後、ゲームIDEデバイス22は、ドッキング用IDEバスをハイ・インピーダンスにし、また、電源制御信号により、ドッキング用電源20もハイ・インピーダンスにする（ステップA20）。ゲームIDEデバイス22は、Undock信号により、イジェクト機構を動作させ、ドッキングIDEデバイス14のコネクタ12をコネクタ16からはずす（ステップA21）。

【0034】次に、本発明のゲームIDEデバイス22内部の3つのスイッチの動作について図6を参照して詳細に説明する。図6は、本発明のゲームIDEデバイスのスイッチのスイッチング動作を表す図である。ここでゲームIDEデバイス22の3つのスイッチのスイッチング動作は、スイッチ32、34、36のうち、全てもしくは、2つ同時にOFFとなる設定はないものと定義する。全てもしくは、2つ同時にONになる設定を使用する。

【0035】スイッチ32=ON、スイッチ34=OFF、スイッチ36=ONの場合は、ドッキング用IDEバスと内部バスを介してレジスタおよび制御回路部38とを接続する。この状態は、ホットドック直後のドッキングIDEデバイス14への初期設定を書き込む場合、もしくは、ホットアンドック直前にドッキングIDEデバイス14へのヘッド退避コマンドを発行する場合のゲームIDEデバイス22の内部バス接続動作である。

【0036】スイッチ32=OFF、スイッチ34=ON、スイッチ36=ONの場合は、IDEバスと内部バスを介してレジスタおよび制御回路部38とを接続する。この状態は、ドッキングIDEデバイス14が実装されていない場合のゲームIDEデバイス22の内部バス接続動作である。

【0037】スイッチ32=ON、スイッチ34=ON、スイッチ36=OFFの場合は、IDEバスと内部バスを介してドッキング用IDEバスとを接続する。この状態は、ドッキングIDEデバイス14が実装されている場合のゲームIDEデバイス22の内部バス接続動作である。

【0038】スイッチ32=ON、スイッチ34=ON、スイッチ36=ONの場合は、IDEバスと内部バスを介してレジスタおよび制御回路部38とドッキング用IDEバスを接続する。この状態は、ドッキングIDEデバイス14が実装された状態で電源ONし、ドッキングIDEデバイス14への初期設定時の内部バス接続動作である。このとき、レジスタおよび制御回路部38は、書き込み動作のみ受け付ける。

【0039】次に、本発明の他の実施例を図7を参照して詳細に説明する。図7は、本発明のIDEデバイス挿抜装置の他の実施例の構成を表すブロック図である。こ

こで一例としてドッキングデバイス40は、フロッピーディスクドライブ42と、新たにID回路44とを備える。

【0040】ID回路44は、ダミーIDEデバイス2がどのような種類のドッキングデバイスが接続したかの認識を可能とするためのデバイスの種類、名称、ベンダー名などの情報を格納する。ダミーIDEデバイス22は、ID回路44に格納されている情報によりIDEデバイス以外のデバイスが入った場合でも、識別できるようになる。これにより、IDE以外のデバイスのホットドック・ホットアンドックをサポートできるようになる。

【0041】ドッキングデバイス40が、ホットドックされた場合、ダミーIDEデバイス22は、ID回路44の情報によりデバイスの種類、名称、ベンダー名などの情報のシリアル信号を含むID信号により、ドッキングデバイスの種類を識別する。ID信号は、シリアルバスなどを用いる。ダミーIDEデバイス22は、ホットドックされたデバイスが、フロッピーディスクドライブ42である場合は、ドッキング用バスとフロッピーディスクバスを接続する。フロッピーディスクコントローラ46は、フロッピーディスクドライブ42にアクセス可能となる。

【0042】また、さまざまなデバイスに対応した、初期設定値が必要になる場合は、ROM48を用意して、それぞれのデバイスに必要な初期設定値をあらかじめROM48内に用意しておく。ダミーIDEデバイス22は、必要に応じてROM48から初期値データを読み込み、ドッキングデバイス40へ設定する。

【0043】次に、本発明のさらに他の実施例を図8を参照し詳細に説明する。図8は、本発明のIDEデバイス挿抜装置のさらに他の実施例の構成を表すブロック図である。ダミーIDEデバイス22を一つのシステムで複数個使用することが可能である。図8では、セカンダリIDバスにもダミーIDEデバイス22を実装した場合を示している。これにより、2つ同時に異なるドッキングIDEデバイスのホットドックまたはホットアンドックをサポートすることができる。なお、ダミーIDEデバイス22の個数は、IDEコントローラ28でコントロールできる最大のIDEデバイスの台数と同じだけ使用することが可能である。

【0044】

【発明の効果】本発明のIDEデバイス挿抜装置は、IDEバス上にダミーIDEデバイスを設けることによりIDEデバイスをホットドック、ホットアンドックすることが可能となる。

【0045】IDEデバイスが実装されていない場合には、ダミーIDEデバイスが、IDEバスと電源をハイ・インピーダンスに保つ。また、ダミーIDEデバイ

は、IDEデバイスの代わりに、IDEコントローラとの通信もおこなう。

【0046】IDEデバイスのホットドックのときは、ダミーIDEデバイスが、IDEデバイスに設定値を書き込んだ後、バスをつなぐ。IDEデバイスのホットアンドックのときは、ダミーIDEデバイスがIDEデバイスにヘッド退避コマンドを発行し、IDEバスと電源をハイ・インピーダンスに保つ。

【図面の簡単な説明】

【図1】本発明のIDEデバイス挿抜装置の構成を表すブロック図である。

【図2】本発明のダミーIDEデバイスの構成を表すブロック図である。

【図3】本発明のIDEデバイス挿抜装置の動作のフローチャートを表す図その1である。

【図4】本発明のIDEデバイス挿抜装置の動作のフローチャートを表す図その2である。

【図5】本発明のIDEデバイス挿抜装置の動作のフローチャートを表す図その3である。

【図6】本発明のダミーIDEデバイスのスイッチのスイッチング動作を表す図である。

【図7】本発明のIDEデバイス挿抜装置の他の実施例の構成を表すブロック図である。

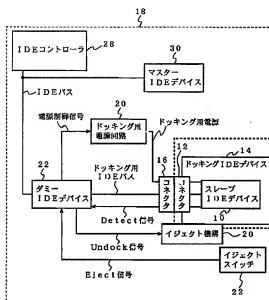
【図8】本発明のIDEデバイス挿抜装置のさらに他の実施例の構成を表すブロック図である。

【図9】従来の挿抜制御方式の構成を表すブロック図である。

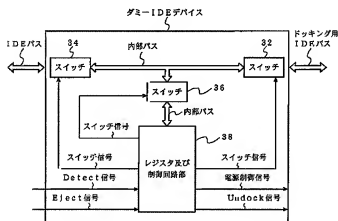
【符号の説明】

- 10 スレーブIDEデバイス
- 12 コネクタ
- 14 ドッキングIDEデバイス
- 16 コネクタ
- 18 情報処理装置
- 20 ドッキング用電源回路
- 22 ダミーIDEデバイス
- 24 イジェクトスイッチ
- 26 イジェクト機構
- 28 IDEコントローラ
- 30 マスターIDEデバイス
- 32 スイッチ
- 34 スイッチ
- 36 スイッチ
- 38 レジスタおよび制御回路部
- 40 ドッキングデバイス
- 42 フロッピーディスクドライブ
- 44 ID回路
- 46 フロッピーディスクコントローラ
- 48 ROM

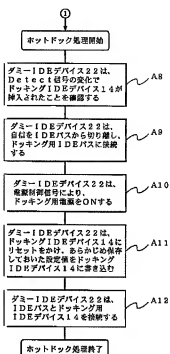
【図1】



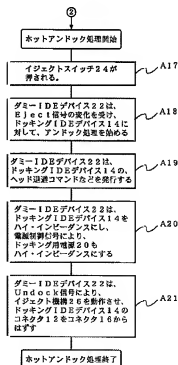
【図2】



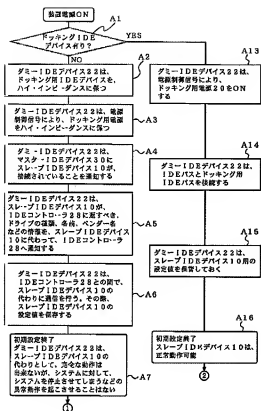
【図4】



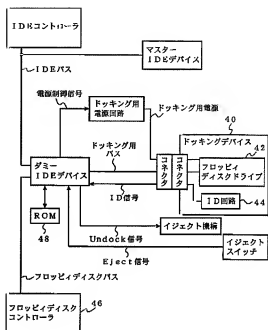
【図5】



【图3】



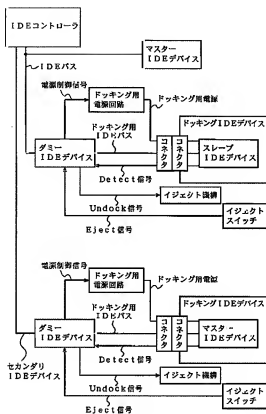
【图7】



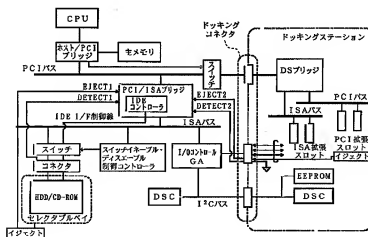
【图6】

スイッチ 32	スイッチ 34	スイッチ 36	デバイス間のバス接続	条件
OFF	OFF	OFF	未定義	なし
OFF	OFF	ON	未定義	なし
ON	OFF	OFF	未定義	なし
ON	OFF	ON	ゲーム1 I Dデバイス** ドッキング I D Eデバイス	ホットドック直後のドッキング I D E デバイスへの明暗変換。もしくは ホットアンドドック直後のドッキング I D Eデバイスへのヘッド選通コマ ンド実行時。
OFF	ON	OFF	未定義	なし
OFF	ON	ON	1 Dコンソール** ゲーム1 I Dデバイス	ドッキング I D Eデバイスがない時。
ON	ON	OFF	1 Dコンソール** ドッキング I D Eデバイス	ドッキング I D Eデバイスが有り、 通常動作時。
ON	ON	ON	1 Dコンソール** ドッキング I D Eデバイス、 ゲーム1 I Dデバイス (書き込みのみ)	ドッキング I D Eデバイスが実装され た状態で電源ONし、ドッキング I D Eデバイスへの明暗変換。 (ゲーム1 I D Eデバイスへは、書き込 みのみ行われる)

【図8】



【図9】



【手続補正書】

【提出日】平成11年10月29日(1999. 10. 29)

【手続補正1】

【補正対象書類名】明細書

【補正対象項目名】特許請求の範囲

【補正方法】変更

【補正内容】

【特許請求の範囲】

【請求項1】処理装置および／または記憶装置を有するデバイスと、前記デバイスを装置へ接続するための第1のコネクタとを有するドッキングＩＤＥデバイスと、前記ドッキングＩＤＥデバイスの第1のコネクタを介して接続するための第2のコネクタとを有し、前記ドッキングデバイスの有無を検知し、前記ドッキングＩＤＥデバイスが接続されているとき電源を供給し、マスター・スレーブ接続するバスに前記ドッキングＩＤＥデバイスを接続し、指示により前記ドッキングＩＤＥデバイスを取り外すと制御系へあたかも前記ドッキングＩＤＥデバイスがあるかのようなダミーの信号を出力する情報処理装置と、を備えることを特徴とするＩＤＥデバイス挿抜装置。

【請求項2】前記情報処理装置は、前記ドッキングＩＤＥデバイスが接続されると電源供給の信号により、電源を供給または停止するドッキング用電源回路と、前記ドッキングＩＤＥデバイスの取り外しの指示を受けると、取り外しの信号を出力し、取り外し許可の信号を取得すると前記第2のコネクタから前記第1のコネクタをはずすイジェクト手段と、前記ドッキングＩＤＥデバイスの接続を検知し、接続しているとき前記電源供給の信号を出力し、前記ドッキングＩＤＥデバイスとＩＤＥバスとをマスター・スレーブ接続し、前記イジェクト手段から前記取り外しの信号が入力されると、前記ドッキングＩＤＥデバイスとＩＤＥバスとを切断し、前記電源供給の信号を出力し電源を停止し、前記取り外し許可信号を出力し、前記ドッキング用電源回路と前記ドッキングＩＤＥデバイス側のＩＤＥバスをハイ・インピーダンス状態に保つダミーＩＤＥデバイスと、を有することを特徴とする請求項1記載のＩＤＥデバイス挿抜装置。

【請求項3】前記ドッキングＩＤＥデバイスは、ハードディスク、ＣＤ-ROM、バッファおよび制御回路であることを特徴とする請求項1または2記載のＩＤＥデバイス挿抜装置。

【請求項4】前記ダミーＩＤＥデバイスは、

前記ドッキングＩＤＥデバイス側のＩＤＥバスと前記ダミーＩＤＥデバイスの第1の内部バスとを第1のスイッチ信号によりスイッチングする第1のスイッチと、前記第1の内部バスと前記ＩＤＥバスとを第2のスイッチ信号によりスイッチングする第2のスイッチと、前記第1の内部バスと第2の内部バスとを第3のスイッチ信号によりスイッチングする第3のスイッチと、前記第1、第2または第3のスイッチ信号を出力し、前記ドッキングＩＤＥデバイスの接続の有無を検知する信号を入力し、前記ドッキングＩＤＥデバイスの個別情報を格納し、前記取り外しの信号を入力し、前記電源供給の信号と前記取り外し許可の信号を出力するレジスタおよび制御回路部と、を有することを特徴とする請求項2記載のＩＤＥデバイス挿抜装置。

【請求項5】前記ドッキングＩＤＥデバイスに格納される前記デバイスが少なくともデバイス自身の前記個別情報を持たないデバイスであるとき、前記ドッキングＩＤＥデバイスに前記個別情報を格納する記憶手段をさらに有することを特徴とする請求項4記載のＩＤＥデバイス挿抜装置。

【請求項6】前記個別情報は、種類、名称およびベンダ名であることを特徴とする請求項4または5記載のＩＤＥデバイス挿抜装置。

【請求項7】前記情報処理装置と前記ドッキングＩＤＥデバイスとをマスター・スレーブ接続することによりバスに複数接続することを特徴とする請求項1、2、3、4または5記載のＩＤＥデバイス挿抜装置。

【請求項8】処理装置および方法および／または記憶装置および方法を、格納するデバイスとを有するドッキングＩＤＥデバイスと、

前記ドッキングＩＤＥデバイスを接続し、前記ドッキングＩＤＥデバイスへの電源の供給源と、制御系につながるバスとを有する情報処理装置とを備えるＩＤＥデバイス挿抜装置におけるＩＤＥデバイス挿抜方法であって、前記ドッキングデバイスの有無を検知し、前記ドッキングＩＤＥデバイスが接続されているとき電源を供給し、前記バスにマスター・スレーブ接続する前記ドッキングＩＤＥデバイスを接続し、指示により前記ドッキングＩＤＥデバイスを取り外すと前記制御系へあたかも前記ドッキングＩＤＥデバイスがあるかのようなダミーの信号を出力することを特徴とするＩＤＥデバイス挿抜方法。

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3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1]An IDE device insert-and-remove device comprising:

A device which has a processing unit and/or memory storage.

A docking IDE device which has the 1st connector for connecting said device to a device, It has the 2nd connector for connecting via the 1st connector of said docking IDE device, A power supply is supplied, when existence of said docking device is detected and said docking IDE device is connected, An information processor which outputs a signal of a straw man when said docking IDE device was connected to a bus which makes master slave connection and said docking IDE device was removed with directions, as if there was said docking IDE device to a control system.

[Claim 2]The IDE device insert-and-remove device comprising according to claim 1:

A power supply circuit for docking where said information processor will supply or stop a power supply with a signal of current supply if said docking IDE device is connected.

An ejecting means which will remove said 1st connector from said 2nd connector if a signal of removal will be outputted if directions of removal of said docking IDE device are received, and a signal of removal permission is acquired, Detect connection of said docking IDE device, and when having connected, a signal of said current supply is outputted, If masterslave connection of said docking IDE device and the IDE bus is made and a signal of said removal is inputted from said ejecting means, A straw-man IDE device which cuts said docking IDE device and an IDE bus, outputs a signal of said current supply, stops a power supply, outputs said removal enabling signal, and maintains said power supply circuit for docking, and an IDE bus by the side of said docking IDE device at a hi-z state.

[Claim 3]The IDE device insert-and-remove device according to claim 1 or 2, wherein said docking IDE devices are a hard disk, CD-ROM, a buffer, and a control circuit.

[Claim 4]The IDE device insert-and-remove device comprising according to claim 2:

The 1st switch for which said straw-man IDE device switches an IDE bus by the side of said docking IDE device, and the 1st internal bus of said straw-man IDE device with the 1st switch signal.

The 2nd switch that switches said 1st internal bus and said IDE bus with the 2nd switch signal.

The 3rd switch that switches said 1st internal bus and the 2nd internal bus with the 3rd switch signal.

Output said 1st, 2nd, and 3rd switch signal, and a signal which detects existence of connection of said docking IDE device is inputted, A register and a controlling circuit part which store individual information of said docking IDE device, input a signal of said removal, and output a signal of said current supply, and a signal of said removal permission.

[Claim 5]The IDE device insert-and-remove device according to claim 4 having further a memory measure which stores said individual information in said docking IDE device when said device stored in said docking IDE device is a device which does not have said of a device's own

individual information at least.

[Claim 6] The IDE device insert-and-remove device according to claim 4 or 5, wherein said individual information is a kind, a name, and a vendor name.

[Claim 7] An IDE device insert-and-remove device of a statement to claims 1-5, wherein more than one connect with a bus by making masterslave connection of said information treating apparatus and said docking IDE device.

[Claim 8] A docking IDE device which has a device which stores a processing unit and a method and/or memory storage, and a method.

Said docking IDE device is connected and it is a supply source of a power supply to said docking IDE device.

An information processor which has a bus which leads to a control system.

Are the IDE device insert-and-remove method provided with the above, and existence of said docking device is detected, A power supply is supplied when said docking IDE device is connected, A signal of a straw man when said docking IDE device which makes master slave connection was connected to said bus and said docking IDE device was removed with directions, as if there was said docking IDE device to said control system is outputted.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]In this invention, when an IDE device carries out hot swapping, it has a straw-man circuit.

Therefore, it is related with the IDE device insert-and-remove device and method of not bringing down a computer body.

[0002]

[Description of the Prior Art]Especially the insert-and-remove method of the IDE (Integrated Device Electronics) device is used for the notebook type personal computer. The over-current might flow into the device and carrying out the insert and remove not only of an IDE device but the device, without dropping a power supply might lead to destruction of the device itself.

[0003]Then, in order to solve this problem, an example of the insert-and-remove method of the conventional device is indicated to JP,10-187304,A. The insert-and-remove control method of the peripheral device in the computer system indicated in this gazette and its system is provided with the docking connector which connects a computer body, a docking station, and a computer body and a docking station as shown in drawing 9.

[0004]CPU and main memory connect a computer body to the PCI bus and ISA (Industry Standard Architecture) bus which are connected via the host/PCI bridge. Recognize that the selector bull bay was connected by receiving a Detect signal, and it is notified to a controller. An internal PCI-ISA bridge device which recognizes that a selector bull bay is removed as receiving an Eject signal, and is notified to a controller, An ISA Bus and the switch which switches a selector bull bay by the switch control from a controller via a connector. The controller which performs switch control of a switch by the notice from an internal PCI-ISA bridge device, etc., The selector bull bay which is constituted from HDD or a CD-ROM and is connected with a computer body via a connector, If an Eject signal is outputted to an internal PCI-ISA bridge device by being pushed when removing a selector bull bay and the signal which removes is received, a selector bull bay will be provided with the shifting ejection from a connector.

[0005]The insert-and-remove method of the device currently indicated by JP,10-187304,A has avoided the fault which HDD/CD-ROM breaks in the case of hot dog HOTTOAN dock, or a system stops by disorder of the signal wire of an ISA Bus and the IDE/F control line.

[0006]An example of the hot-swapping method of detecting and backing up poor access at the time of the insert and remove of the conventional device is indicated to JP,9-311742,A. An information processor indicated in this gazette, and the hot-swapping method for the same. It is the battle insert-and-remove method which carries out the insert and remove of the printed circuit board which has circuits, such as an information processing section and a storage parts store, and the printed circuit board in the information processor which two or more printed circuit boards connect, and is provided with a lead or the system bath which carries out right access from a system bath. It has further an unlawful access supervisory circuit which supervises unlawful access to the predetermined printed circuit board, and a straw-man retry circuit which an access cycle is made to retry at the time of detection of unlawful access.

Thereby, the writing of data mistaken even if the insert and remove of the printed circuit board were carried out during access of an information processor will be lost, and malfunction will not take place. Furthermore, the outgoing end of the signal which outputs this information processor on a system bath at the time of insertion of the printed circuit board serves as high impedance. [0007]

[Problem(s) to be Solved by the Invention]The insert-and-remove control method of the peripheral device in a computer system given in JP,10-187304,A, and its system, After a hot dog, in order that the IDE devices, such as HDD or CD-ROM, may operate normally, initial setting etc. must be carried out to HDD/CD-ROM with a software driver. The hot dog HOTTOAN dock processing by a software driver also has a case which does not carry out normal operation, for example by the difference in OS, the difference in the kind of CD-ROM drive, etc. In that case, the inconvenience corresponding to various OS's that the software driver set by the kind of various devices must be created arises.

[0008]There are an information processor and the hot-swapping method for the same given in JP,9-311742,A in insert-and-remove ***** not being made until a lead and a light are completed by the printed circuit board. Carrying out insert and remove at this time makes it the fault of an information processor produced. If one of a power supply and OFF are performed furthermore removed, an information processor will be treated with a thing with the printed circuit board which removed, for example, but a device may be made to produce fault, when the signal of relevance does not return.

[0009]There is the purpose of this invention in providing the IDE device insert-and-remove device and method of preventing the system failure of a computer body by having a straw-man circuit, when carrying out the insert and remove of the device from a live wire.

[0010]

[Means for Solving the Problem]A device with which an IDE device insert-and-remove device of this invention stores a processing unit and a method and/or memory storage, and a method, A docking device which has the 1st connector for connecting with a device, It has the 2nd connector for connecting via the 1st connector of said docking device, A power supply is supplied, when existence of said docking device is detected and said docking device is connected, It has an information processor which outputs a signal of a straw man when said docking device was connected to a bus which makes master slave connection and said docking device was removed with directions, as if there was said docking device to a control system.

[0011]An IDE device insert-and-remove method of this invention a processing unit and a method and/or memory storage, and a method, Connect and a docking IDE device which has a device to store, and said docking IDE device A supply source of a power supply to said docking IDE device, It is the IDE device insert-and-remove method that an IDE device insert-and-remove device provided with an information processor which has a bus which leads to a control system can be set, A power supply is supplied, when existence of said docking device is detected and said docking IDE device is connected, A signal of a straw man when said docking IDE device which makes master slave connection was connected to said bus and said docking IDE device was removed with directions, as if there was said docking IDE device to said control system is outputted.

[0012]

[Embodiment of the Invention]This invention by having formed the straw-man IDE device on the IDE interface in a personal computer, It is characterized by hot dog HOTTOAN dock becoming possible also to the peripheral device of the personal computer which is not supporting hot swapping called hot dog HOTTOAN dock.

[0013]The composition of the example of this invention is explained in detail with reference to drawing 1. Drawing 1 is a block diagram showing the composition of the IDE device insert-and-remove device of this invention. The slave IDE devices 10, such as DVD, a hard disk drive, and a CD-ROM drive, The docking IDE device 14 which is a device for having the connector 12 which is an input/output terminal for being connected with a slave IDE device and exchanging an external device and data, and carrying out insert and remove to an external device, When it has the connector 12 and the connectable connector 16 when connecting the docking IDE device 14,

and the connector 12 and the connector 16 connect. When supplying a power supply to the docking IDE device 14 with directions, connecting a bus so that the operation as other devices with the same slave IDE device 10 may be possible, and separating the docking IDE device 14 with the directions from a user, it has the information processor 18 which changes a bus etc. in false into the state where it is connected in a certain device so that current supply may be suspended and a system may not stop.

[0014]The information processor 18 is provided with the following.

The power supply circuit 20 for docking which supplies a power supply to the docking IDE device 14 with directions.

The IDE bus for detecting that the docking IDE device 14 was connected by change of the Detect signal sent via the connectors 12 and 16, transmitting directions of a current supply start to the power supply circuit 20 for docking by detection, and making masterslave connection.

The IDE bus for docking which is a channel of data with the slave IDE device 10 is connected via the connectors 12 and 16, Will output a Undock signal, if change of an Eject signal is detected, and it points to the stop of current supply to the power supply circuit 20 for docking. The straw-man IDE device 22 which ** an IDE bus and the IDE bus for docking, and makes the power supply circuit 20 for docking, and the IDE bus for docking a high impedance state.

The ejecting switch 24 which an Eject signal changes and is notified to the straw-man IDE device 22 when one [a user]. The ejecting mechanism 26 which removes the docking IDE device 14 from a connector with the motor or spring built in by the Undock signal from the straw-man IDE device 22.

[0015]Furthermore, the information processor 18 connects to an IDE bus IDE controller 28 which controls the whole device and is further connected to CPU etc. by bus, and the master IDE devices 30, such as DVD, a hard disk drive, and a CD-ROM drive.

[0016]The straw-man IDE device 22 is located on the IDE bus between IDE controller 28 and the docking IDE device 14. Usually, an IDE device is connectable to two sets by one bus by making masterslave connection on a bus. In this example, the straw-man IDE device 22 has been arranged on the bus connected to the docking IDE device 14 having the slave IDE device 10, and the IDE bus and the docking IDE bus are separated. Thereby, even if HOTTOAN dock is carried out, there is no influence in the waveform of the signal of an IDE bus, and it does not have [of 14 docking IDE device / a hot dog or] an adverse effect on the master IDE device 30.

[0017]The straw-man IDE device 22 is in the state of a Detect signal, and judges whether the docking IDE device 14 is connected. When the docking IDE device 14 is not docked with the straw-man IDE device 22, It communicates with IDE controller 28 instead of the docking IDE device 14, and as there is the docking IDE device 14 to IDE controller 28, it shows. When the docking IDE device 22 actually has access, it notifies IDE controller 28 that operation of data transfer etc. cannot be performed, and it operates so that a system may not be made to hang-up. A Detect signal is serial and includes information, including the kind of slave IDE device 10, a name, etc.

[0018]When the docking IDE device 14 is not connected, the straw-man IDE device 22, The IDE bus for docking and the power supply for docking are maintained at high impedance, an over-current flows into the moment of a hot dog, and it is made not to give a damage to the docking IDE device 14. The power supply for docking is made by the power supply circuit 20 for docking, and operation of power supply ON/OFF is controlled by the power source control signal from the straw-man IDE device 22.

[0019]When the hot dog of the docking IDE device 14 is carried out, by change of a Detect signal, the straw-man IDE device 22 recognizes that the docking IDE device 14 was connected, turns ON the power supply for docking, and makes the IDE bus for docking a usable state. The straw-man IDE device 22 applies reset to the docking IDE device 14, beforehand, writes the initialized value for docking IDE device 14 saved in the straw-man IDE device 22 in the docking IDE device 14, and enables operation of it. Then, IDE controller 28 connects an IDE bus and the IDE bus for docking to the docking IDE device 14 to the timing which has not been accessed. In this the operation of a series of, IDE controller 28 enables control of the docking IDE device 14.

[0020]When the HOTTOAN dock of the docking IDE device 14 is carried out, first, the ejecting switch 24 is pushed by the user and an Eject signal changes. The straw-man IDE device 22 is timing without access between the docking IDE device 14 and IDE controller 28, and separates an IDE bus and the IDE bus for docking. Then, the straw-man IDE device 22 makes high impedance the IDE bus for docking, and the power supply for docking, after publishing a head evacuation command etc. to the docking IDE device 14. Then, a Undock signal notifies the straw-man IDE device 22 that the docking IDE device 14 is removed to the ejecting mechanism 26. The ejecting mechanism 26 removes the connector 12 on the docking IDE device 22 from the connector 16 by an internal motor etc.

[0021]A motor etc. may be used about an ejecting mechanism and a spring etc. may be sufficient here. LED is shone, or a buzzer is sounded, it reports that it may remove to a user, and a user may enable it to remove a docking IDE device manually.

[0022]Next, the composition of a straw-man IDE device is explained in detail with reference to drawing 2. Drawing 2 is a block diagram showing the composition of the straw-man IDE device of this invention. The switch 32 on which the straw-man IDE device 22 performs switching for input and output with the IDE bus for docking, and the straw-man IDE device 22 with a switch signal. The switch 34 which performs switching for input and output with the internal bus from the switch 32, and the IDE bus to IDE controller 28 with a switch signal. The switch 36 which connects with the switch 32 and the switch 34 with an internal bus, and switches input and output with an internal bus to a register and a control system with a switch signal with a switch signal. Connect the internal bus from the switch 36 and a Detect signal and an Eject signal are inputted. According to change of which signal, a power source control signal and a Undock signal are outputted, and it has the register and the controlling circuit part 38 which output and switch a switch signal to the switches 32, 34, and 36.

[0023]A register and the controlling circuit part 38 control the switches 32, 34, and 36, as mentioned above, and also they generate a power source control signal and a Undock signal according to the state of a Detect signal and an Eject signal. A register and the controlling circuit part 38 save the preset value for docking IDE device 14, and carry out initial setting immediately after the hot dog of the docking IDE device 14 instead of IDE controller 28. Furthermore, the register and the controlling circuit part 38 have the function to perform communication with IDE controller 28 instead of the docking IDE device 14, when the docking IDE device 14 is not mounted.

[0024]Next, with reference to drawing 5, it explains in detail from the explanatory view 3 of operation of the example of this invention. Drawing 3 is 1 of **** showing the flow chart of operation of the IDE device insert-and-remove device of this invention. Drawing 4 is 2 of **** showing the flow chart of operation of the IDE device insert-and-remove device of this invention of this invention. Drawing 5 is 3 of **** showing the flow chart of operation of the IDE device insert-and-remove device of this invention of this invention.

[0025]If an IDE device insert-and-remove device has device power turned on, it will rise by recognizing ON. The straw-man IDE device 22 judges the existence of the docking IDE device 14 with a Detect signal (Step A1). When a Detect signal shows 0V when the docking IDE device 14 is mounted, and not mounted, as 5V is shown, potential changes.

[0026]When the straw-man IDE device 22 has recognized the docking IDE device 14 to be nothing as a result of judgment of Step A1, the IDE bus for docking is maintained at a hi-z state (Step A2). Then, the straw-man IDE device 22 maintains the power supply 20 for docking at a hi-z state (step A3). Maintaining at a hi-z state is for an over-current to flow at the moment of the hot dog of the docking IDE device 14 being carried out, and not to destroy the circuit component of docking IDE device 14 inside.

[0027]Next, the straw-man IDE device 22 reports that the slave IDE device 10 in the docking IDE device 14 is connected to the master IDE device 30 (step A4). This is required processing performed between two IDE devices by which masterslave connection was made on the IDE bus. In practice, since the docking IDE device 14 is not connected, the straw-man IDE device 22 performs above-mentioned operation instead of the slave IDE device 10. There are kinds (a CD-ROM drive, a hard disk drive, etc.) of IDE device, a name, a vendor name, etc. as information

which the slave IDE device 10 outputs to IDE controller 28. This information is beforehand saved in the straw-man IDE device.

[0028] And when the slave IDE device 10 is not mounted, instead of the slave IDE device 10, the straw-man IDE device 22 outputs these information to IDE controller 28 (step A5). After OS boots this operation, it is required in order to make inclusion of a software driver possible. The straw-man IDE device 22 writes the preset value for slave IDE device 10 by IDE controller 1 in the register in the straw-man IDE device 22, and the register of the controlling circuit part 38 (Step A6). Preset values are PIO transfer mode setting, DMA transfer mode setting, standby timer settings, etc., when the slave IDE device 10 is a hard disk drive. When these preset values are written in the register in the straw-man IDE device 22 and there is a hot dog of the docking IDE device 14, it prepares for the operation written in the slave IDE device 10 instead of IDE controller 28.

[0029] The flow from the device power ON in case the docking IDE device 22 is not mounted above to initial setting is an end (Step A7).

[0030] In spite of not mounting the docking IDE device 14 accidentally [user], when a file transfer etc. are accessed at the docking IDE device 14, It is made not to make the fault that a system stops cause, when the straw-man IDE device 14 answered and anything did not have a response from a device.

[0031] When the docking IDE device 14 is mounted before the device power ON, the straw-man IDE device 22 turns ON the power supply 20 for docking, and connects an IDE bus and the IDE bus for docking. Thereby, as for IDE controller 28 and the docking IDE device 14, the usual access is attained. The straw-man IDE device 22 saves the same value as the preset value for docking IDE device 14 in the register. Since this preset value is needed when saying that hot dog HOTTOAN dock is repeated repeatedly when a user does the hot dog of the docking IDE device 14 once again behind HOTTOAN dock, it is always saved in the straw-man IDE device 22.

[0032] Next, a hot dog is explained using the flow chart of drawing 4. The straw-man IDE device 22 recognizes that the hot dog of the docking IDE device 14 was carried out by change of the Detect signal (Step A8). IDE controller 28 separates self from an IDE bus after checking not having accessed the straw-man IDE device 22, and connects the straw-man IDE device 22 to the IDE bus for docking (step A9). The straw-man IDE device 22 turns on the power supply 20 for docking with a power source control signal (Step A10). The straw-man IDE device 22 applies reset to the docking IDE device 14, and writes the preset value saved beforehand at the register in the docking IDE device 14 (Step A11). Then, an IDE bus and the bus for docking are connected (Step A12), operation of the docking IDE device 14 is attained, and a hot dog ends it. [0033] Next, HOTTOAN dock is explained using the flow chart of drawing 5. If the ejecting switch 24 is pushed by the user (Step A17), the straw-man IDE device 22 will receive change of an Eject signal, and will begin HOTTOAN dock processing to the docking IDE device 14 by him (Step A18). The straw-man IDE device 22 publishes a head evacuation command etc. to the docking IDE device 14, after checking that IDE controller 28 has not accessed the docking IDE device 14 (Step A19). Then, the straw-man IDE device 22 makes the IDE bus for docking high impedance, and also makes the power supply 20 for docking high impedance with a power source control signal (Step A20). With a Undock signal, the straw-man IDE device 22 operates an ejecting mechanism, and removes the connector 12 of the docking IDE device 14 from the connector 16 (Step A21).

[0034] Next, operation of three switches inside [straw-man IDE device 22] this invention is explained in detail with reference to drawing 6. Drawing 6 is a figure showing the switching operation of the switch of the straw-man IDE device of this invention. It is defined as what setting out from which as for the switching operation of three switches of the straw-man IDE device 22 or two serve as OFF simultaneous among the switches 32, 34, and 36 does not have here. Setting out of all [or] simultaneously set to ON two is used.

[0035] In switch 32=ON, switch 34=OFF, and switch 36=ON, a register and the controlling circuit part 38 are connected via the IDE bus for docking, and an internal bus. This state is the internal bus connecting operation of the straw-man IDE device 22 in the case of publishing the head evacuation command to the docking IDE device 14 just before HOTTOAN dock, when writing in

initial setting to the docking IDE device 14 just behind a hot dog.

[0036]In switch 32=OFF, switch 34=ON, and switch 36=ON, a register and the controlling circuit part 38 are connected via an IDE bus and an internal bus. This state is the internal bus connecting operation of the straw-man IDE device 22 in case the docking IDE device 14 is not mounted.

[0037]In switch 32=ON, switch 34=ON, and switch 36=OFF, the IDE bus for docking is connected via an IDE bus and an internal bus. This state is the internal bus connecting operation of the straw-man IDE device 22 in case the docking IDE device 14 is mounted.

[0038]In switch 32=ON, switch 34=ON, and switch 36=ON, the IDE bus for docking is connected with a register and the controlling circuit part 38 via an IDE bus and an internal bus. This state carries out power supply ON, where the docking IDE device 14 is mounted, and it is the internal bus connecting operation at the time of initial setting to the docking IDE device 14. At this time, a register and the controlling circuit part 38 receive only writing operation.

[0039]Next, other examples of this invention are described in detail with reference to drawing 7. Drawing 7 is a block diagram showing the composition of other examples of the IDE device insert-and-remove device of this invention. The docking device 40 is provided with the following as an example here.

Floppy disk drive 42.

It is newly the ID circuit 44.

[0040]The ID circuit 44 stores information, including the kind of device for the straw-man IDE device 22 to enable recognition of what kind of docking device connected, a name, a vendor name, etc. The straw-man IDE device 22 can be identified even when devices other than an IDE device enter using the information stored in the ID circuit 44. Thereby, the hot dog HOTTOAN dock of devices other than IDE can be supported now.

[0041]When the hot dog of the docking device 40 is carried out, the straw-man IDE device 22 identifies the kind of docking device with the ID signal which includes the serial signal of information, including the kind of device, a name, a vendor name, etc., using the information on the ID circuit 44. A serial bus etc. are used for an ID signal. The straw-man IDE device 22 connects the bus for docking, and a floppy disk bus, when the device by which the hot dog was carried out is the floppy disk drive 42. The floppy disk controller 46 becomes accessible to the floppy disk drive 42.

[0042]When the initialized value corresponding to various devices is needed, ROM48 is prepared and the initialized value required for each device is beforehand prepared in ROM48. The straw-man IDE device 22 reads initial value data from ROM48 if needed, and sets it to the docking device 40.

[0043]Next, the example of further others of this invention is described in detail with reference to drawing 8. Drawing 8 is a block diagram showing the composition of the example of further others of the IDE device insert-and-remove device of this invention. It is possible to use two or more straw-man IDE devices 22 by one system. Drawing 8 shows the case where the straw-man IDE device 22 is mounted also in a secondary IDE bus. The hot dog or HOTTOAN dock of a docking IDE device which is simultaneously different by this as for two can be supported. The number of the straw-man IDE device 22 can be used as the same as the number of the greatest IDE device controllable with IDE controller 28.

[0044]

[Effect of the Invention]The IDE device insert-and-remove device of this invention becomes possible [a hot dog and carrying out HOTTOAN dock] about an IDE device by forming a straw-man IDE device on an IDE bus.

[0045]When the IDE device is not mounted, a straw-man IDE device maintains an IDE bus and a power supply at high impedance. A straw-man IDE device also performs communication with an IDE controller instead of an IDE device.

[0046]At the time of the hot dog of an IDE device, after a straw-man IDE device writes a preset value in an IDE device, a bus is connected. At the time of the HOTTOAN dock of an IDE device, a straw-man IDE device publishes a head evacuation command to an IDE device, and an IDE bus

and a power supply are maintained at high impedance.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention]In this invention, when an IDE device carries out hot swapping, it has a straw-man circuit.
Therefore, it is related with the IDE device insert-and-remove device and method of not bringing down a computer body.

[Translation done.]

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PRIOR ART

[Description of the Prior Art] Especially the insert-and-remove method of the IDE (Integrated Device Electronics) device is used for the notebook type personal computer. The over-current might flow into the device and carrying out the insert and remove not only of an IDE device but the device, without dropping a power supply might lead to destruction of the device itself.

[0003] Then, in order to solve this problem, an example of the insert-and-remove method of the conventional device is indicated to JP,10-187304.A. The insert-and-remove control method of the peripheral device in the computer system indicated in this gazette and its system is provided with the docking connector which connects a computer body, a docking station, and a computer body and a docking station as shown in drawing 9.

[0004] CPU and main memory connect a computer body to the PCI bus and ISA (Industry Standard Architecture) bus which are connected via the host/PCI bridge. Recognize that the selector bull bay was connected by receiving a Detect signal, and it is notified to a controller, An internal PCI-ISA bridge device which recognizes that a selector bull bay is removed as receiving an Eject signal, and is notified to a controller, An ISA Bus and the switch which switches a selector bull bay by the switch control from a controller via a connector. The controller which performs switch control of a switch by the notice from an internal PCI-ISA bridge device, etc., The selector bull bay which is constituted from HDD or a CD-ROM and is connected with a computer body via a connector. If an Eject signal is outputted to an internal PCI-ISA bridge device by being pushed when removing a selector bull bay and the signal which removes is received, a selector bull bay will be provided with the shifting ejection from a connector.

[0005] The insert-and-remove method of the device currently indicated by JP,10-187304.A has avoided the fault which HDD/CD-ROM breaks in the case of hot dog HOTTOAN dock, or a system stops by disorder of the signal wire of an ISA Bus and the IDEI/F control line.

[0006] An example of the hot-swapping method of detecting and backing up poor access at the time of the insert and remove of the conventional device is indicated to JP,9-311742.A. An information processor indicated in this gazette, and the hot-swapping method for the same, it is the battle insert-and-remove method which carries out the insert and remove of the printed circuit board which has circuits, such as an information processing section and a storage parts store, and the printed circuit board in the information processor which two or more printed circuit boards connect, and is provided with a lead or the system bath which carries out right access from a system bath. It has further an unlawful access supervisory circuit which supervises unlawful access to the predetermined printed circuit board, and a straw-man retry circuit which an access cycle is made to retry at the time of detection of unlawful access. Thereby, the writing of data mistaken even if the insert and remove of the printed circuit board were carried out during access of an information processor will be lost, and malfunction will not take place. Furthermore, the outgoing end of the signal which outputs this information processor on a system bath at the time of insertion of the printed circuit board serves as high impedance.

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EFFECT OF THE INVENTION

[Effect of the Invention]The IDE device insert-and-remove device of this invention becomes possible [a hot dog and carrying out HOTTOAN dock] about an IDE device by forming a straw-man IDE device on an IDE bus.

[0045]When the IDE device is not mounted, a straw-man IDE device maintains an IDE bus and a power supply at high impedance. A straw-man IDE device also performs communication with an IDE controller instead of an IDE device.

[0046]At the time of the hot dog of an IDE device, after a straw-man IDE device writes a preset value in an IDE device, a bus is connected. At the time of the HOTTOAN dock of an IDE device, a straw-man IDE device publishes a head evacuation command to an IDE device, and an IDE bus and a power supply are maintained at high impedance.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]The insert-and-remove control method of the peripheral device in a computer system given in JP,10-187304,A, and its system, After a hot dog, in order that the IDE devices, such as HDD or CD-ROM, may operate normally, initial setting etc. must be carried out to HDD/CD-ROM with a software driver. The hot dog HOTTOAN dock processing by a software driver also has a case which does not carry out normal operation, for example by the difference in OS, the difference in the kind of CD-ROM drive, etc. In that case, the inconvenience corresponding to various OS's that the software driver set by the kind of various devices must be created arises.

[0008]There are an information processor and the hot-swapping method for the same given in JP,9-311742,A in insert-and-remove ***** not being made until a lead and a light are completed by the printed circuit board. Carrying out insert and remove at this time makes it the fault of an information processor produced. If one of a power supply and OFF are performed furthermore removed, an information processor will be treated with a thing with the printed circuit board which removed, for example, but a device may be made to produce fault, when the signal of relevance does not return.

[0009]There is the purpose of this invention in providing the IDE device insert-and-remove device and method of preventing the system failure of a computer body by having a straw-man circuit, when carrying out the insert and remove of the device from a live wire.

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MEANS

[Means for Solving the Problem]A device with which an IDE device insert-and-remove device of this invention stores a processing unit and a method and/or memory storage, and a method, A docking device which has the 1st connector for connecting with a device, It has the 2nd connector for connecting via the 1st connector of said docking device, A power supply is supplied, when existence of said docking device is detected and said docking device is connected, It has an information processor which outputs a signal of a straw man when said docking device was connected to a bus which makes master slave connection and said docking device was removed with directions, as if there was said docking device to a control system.

[0011]An IDE device insert-and-remove method of this invention a processing unit and a method and/or memory storage, and a method, Connect and a docking IDE device which has a device to store, and said docking IDE device A supply source of a power supply to said docking IDE device, It is the IDE device insert-and-remove method that an IDE device insert-and-remove device provided with an information processor which has a bus which leads to a control system can be set, A power supply is supplied, when existence of said docking device is detected and said docking IDE device is connected, A signal of a straw man when said docking IDE device which makes master slave connection was connected to said bus and said docking IDE device was removed with directions, as if there was said docking IDE device to said control system is outputted.

[0012]

[Embodiment of the Invention]This invention by having formed the straw-man IDE device on the IDE interface in a personal computer, It is characterized by hot dog HOTTOAN dock becoming possible also to the peripheral device of the personal computer which is not supporting hot swapping called hot dog HOTTOAN dock.

[0013]The composition of the example of this invention is explained in detail with reference to drawing 1. Drawing 1 is a block diagram showing the composition of the IDE device insert-and-remove device of this invention. The slave IDE devices 10, such as DVD, a hard disk drive, and a CD-ROM drive, The docking IDE device 14 which is a device for having the connector 12 which is an input/output terminal for being connected with a slave IDE device and exchanging an external device and data, and carrying out insert and remove to an external device, When it has the connector 12 and the connectable connector 16 when connecting the docking IDE device 14, and the connector 12 and the connector 16 connect, When supplying a power supply to the docking IDE device 14 with directions, connecting a bus so that the operation as other devices with the same slave IDE device 10 may be possible, and separating the docking IDE device 14 with the directions from a user, it has the information processor 18 which changes a bus etc. in false into the state where it is connected in a certain device so that current supply may be suspended and a system may not stop.

[0014]The information processor 18 is provided with the following.

The power supply circuit 20 for docking which supplies a power supply to the docking IDE device 14 with directions.

The IDE bus for detecting that the docking IDE device 14 was connected by change of the Detect signal sent via the connectors 12 and 16, transmitting directions of a current supply start

to the power supply circuit 20 for docking by detection, and making masterslave connection. The IDE bus for docking which is a channel of data with the slave IDE device 10 is connected via the connectors 12 and 16. Will output a Undock signal, if change of an Eject signal is detected, and it points to the stop of current supply to the power supply circuit 20 for docking. The straw-man IDE device 22 which ** an IDE bus and the IDE bus for docking, and makes the power supply circuit 20 for docking, and the IDE bus for docking a high impedance state. The ejecting switch 24 which an Eject signal changes and is notified to the straw-man IDE device 22 when one [a user], The ejecting mechanism 26 which removes the docking IDE device 14 from a connector with the motor or spring built in by the Undock signal from the straw-man IDE device 22.

[0015]Furthermore, the information processor 18 connects to an IDE bus IDE controller 28 which controls the whole device and is further connected to CPU etc. by bus, and the master IDE devices 30, such as DVD, a hard disk drive, and a CD-ROM drive.

[0016]The straw-man IDE device 22 is located on the IDE bus between IDE controller 28 and the docking IDE device 14. Usually, an IDE device is connectable to two sets by one bus by making masterslave connection on a bus. In this example, the straw-man IDE device 22 has been arranged on the bus connected to the docking IDE device 14 having the slave IDE device 10, and the IDE bus and the docking IDE bus are separated. Thereby, even if HOTTOAN dock is carried out, there is no influence in the waveform of the signal of an IDE bus, and it does not have [of 14 docking IDE device / a hot dog or] an adverse effect on the master IDE device 30.

[0017]The straw-man IDE device 22 is in the state of a Detect signal, and judges whether the docking IDE device 14 is connected. When the docking IDE device 14 is not docked with the straw-man IDE device 22, It communicates with IDE controller 28 instead of the docking IDE device 14, and as there is the docking IDE device 14 to IDE controller 28, it shows. When the docking IDE device 22 actually has access, it notifies IDE controller 28 that operation of data transfer etc. cannot be performed, and it operates so that a system may not be made to hang-up. A Detect signal is serial and includes information, including the kind of slave IDE device 10, a name, etc.

[0018]When the docking IDE device 14 is not connected, the straw-man IDE device 22, The IDE bus for docking and the power supply for docking are maintained at high impedance, an over-current flows into the moment of a hot dog, and it is made not to give a damage to the docking IDE device 14. The power supply for docking is made by the power supply circuit 20 for docking, and operation of power supply ON/OFF is controlled by the power source control signal from the straw-man IDE device 22.

[0019]When the hot dog of the docking IDE device 14 is carried out, by change of a Detect signal, the straw-man IDE device 22 recognizes that the docking IDE device 14 was connected, turns ON the power supply for docking, and makes the IDE bus for docking a usable state. The straw-man IDE device 22 applies reset to the docking IDE device 14, beforehand, writes the initialized value for docking IDE device 14 saved in the straw-man IDE device 22 in the docking IDE device 14, and enables operation of it. Then, IDE controller 28 connects an IDE bus and the IDE bus for docking to the docking IDE device 14 to the timing which has not been accessed. In this the operation of a series of, IDE controller 28 enables control of the docking IDE device 14.

[0020]When the HOTTOAN dock of the docking IDE device 14 is carried out, first, the ejecting switch 24 is pushed by the user and an Eject signal changes. The straw-man IDE device 22 is timing without access between the docking IDE device 14 and IDE controller 28, and separates an IDE bus and the IDE bus for docking. Then, the straw-man IDE device 22 makes high impedance the IDE bus for docking, and the power supply for docking, after publishing a head evacuation command etc. to the docking IDE device 14. Then, a Undock signal notifies the straw-man IDE device 22 that the docking IDE device 14 is removed to the ejecting mechanism 26. The ejecting mechanism 26 removes the connector 12 on the docking IDE device 22 from the connector 16 by an internal motor etc.

[0021]A motor etc. may be used about an ejecting mechanism and a spring etc. may be sufficient here. LED is shone, or a buzzer is sounded, it reports that it may remove to a user, and a user

may enable it to remove a docking IDE device manually.

[0022]Next, the composition of a straw-man IDE device is explained in detail with reference to drawing 2. Drawing 2 is a block diagram showing the composition of the straw-man IDE device of this invention. The switch 32 on which the straw-man IDE device 22 performs switching for input and output with the IDE bus for docking, and the straw-man IDE device 22 with a switch signal. The switch 34 which performs switching for input and output with the internal bus from the switch 32, and the IDE bus to IDE controller 28 with a switch signal. The switch 36 which connects with the switch 32 and the switch 34 with an internal bus, and switches input and output with an internal bus to a register and a control system with a switch signal with a switch signal. Connect the internal bus from the switch 36 and a Detect signal and an Eject signal are inputted. According to change of which signal, a power source control signal and a Undock signal are outputted, and it has the register and the controlling circuit part 38 which output and switch a switch signal to the switches 32, 34, and 36.

[0023]A register and the controlling circuit part 38 control the switches 32, 34, and 36, as mentioned above, and also they generate a power source control signal and a Undock signal according to the state of a Detect signal and an Eject signal. A register and the controlling circuit part 38 save the preset value for docking IDE device 14, and carry out initial setting immediately after the hot dog of the docking IDE device 14 instead of IDE controller 28. Furthermore, the register and the controlling circuit part 38 have the function to perform communication with IDE controller 28 instead of the docking IDE device 14, when the docking IDE device 14 is not mounted.

[0024]Next, with reference to drawing 5, it explains in detail from the explanatory view 3 of operation of the example of this invention. Drawing 3 is 1 of **** showing the flow chart of operation of the IDE device insert-and-remove device of this invention. Drawing 4 is 2 of **** showing the flow chart of operation of the IDE device insert-and-remove device of this invention of this invention. Drawing 5 is 3 of **** showing the flow chart of operation of the IDE device insert-and-remove device of this invention of this invention.

[0025]If an IDE device insert-and-remove device has device power turned on, it will rise by recognizing ON. The straw-man IDE device 22 judges the existence of the docking IDE device 14 with a Detect signal (Step A1). When a Detect signal shows 0V when the docking IDE device 14 is mounted, and not mounted, as 5V is shown, potential changes.

[0026]when the straw-man IDE device 22 has recognized the docking IDE device 14 to be nothing as a result of judgment of Step A1, the IDE bus for docking is maintained at a hi-z state (Step A2). Then, the straw-man IDE device 22 maintains the power supply 20 for docking at a hi-z state (step A3). Maintaining at a hi-z state is for an over-current to flow at the moment of the hot dog of the docking IDE device 14 being carried out, and not to destroy the circuit component of docking IDE device 14 inside.

[0027]Next, the straw-man IDE device 22 reports that the slave IDE device 10 in the docking IDE device 14 is connected to the master IDE device 30 (step A4). This is required processing performed between two IDE devices by which masterslave connection was made on the IDE bus. In practice, since the docking IDE device 14 is not connected, the straw-man IDE device 22 performs above-mentioned operation instead of the slave IDE device 10. There are kinds (a CD-ROM drive, a hard disk drive, etc.) of IDE device, a name, a vendor name, etc. as information which the slave IDE device 10 outputs to IDE controller 28. These information is beforehand saved in the straw-man IDE device.

[0028]And when the slave IDE device 10 is not mounted, instead of the slave IDE device 10, the straw-man IDE device 22 outputs these information to IDE controller 28 (step A5). After OS boots this operation, it is required in order to make inclusion of a software driver possible. The straw-man IDE device 22 writes the preset value for slave IDE device 10 by IDE controller 1 in the register in the straw-man IDE device 22, and the register of the controlling circuit part 38 (Step A6). Preset values are PIO transfer mode setting, DMA transfer mode setting, standby timer settings, etc., when the slave IDE device 10 is a hard disk drive. When these preset values are written in the register in the straw-man IDE device 22 and there is a hot dog of the docking IDE device 14, it prepares for the operation written in the slave IDE device 10 instead of IDE

controller 28.

[0029]The flow from the device power ON in case the docking IDE device 22 is not mounted above to initial setting is an end (Step A7).

[0030]In spite of not mounting the docking IDE device 14 accidentally [user], when a file transfer etc. are accessed at the docking IDE device 14, it is made not to make the fault that a system stops cause, when the straw-man IDE device 14 answered and anything did not have a response from a device.

[0031]When the docking IDE device 14 is mounted before the device power ON, the straw-man IDE device 22 turns ON the power supply 20 for docking, and connects an IDE bus and the IDE bus for docking. Thereby, as for IDE controller 28 and the docking IDE device 14, the usual access is attained. The straw-man IDE device 22 saves the same value as the preset value for docking IDE device 14 in the register. Since this preset value is needed when saying that hot dog HOTTOAN dock is repeated repeatedly when a user does the hot dog of the docking IDE device 14 once again behind HOTTOAN dock, it is always saved in the straw-man IDE device 22.

[0032]Next, a hot dog is explained using the flow chart of drawing 4. The straw-man IDE device 22 recognizes that the hot dog of the docking IDE device 14 was carried out by change of the Detect signal (Step A8). IDE controller 28 separates self from an IDE bus after checking not having accessed the straw-man IDE device 22, and connects the straw-man IDE device 22 to the IDE bus for docking (step A9). The straw-man IDE device 22 turns on the power supply 20 for docking with a power source control signal (Step A10). The straw-man IDE device 22 applies reset to the docking IDE device 14, and writes the preset value saved beforehand at the register in the docking IDE device 14 (Step A11). Then, an IDE bus and the bus for docking are connected (Step A12), operation of the docking IDE device 14 is attained, and a hot dog ends it.

[0033]Next, HOTTOAN dock is explained using the flow chart of drawing 5. If the ejecting switch 24 is pushed by the user (Step A17), the straw-man IDE device 22 will receive change of an Eject signal, and will begin HOTTOAN dock processing to the docking IDE device 14 by him (Step A18). The straw-man IDE device 22 publishes a head evacuation command etc. to the docking IDE device 14, after checking that IDE controller 28 has not accessed the docking IDE device 14 (Step A19). Then, the straw-man IDE device 22 makes the IDE bus for docking high impedance, and also makes the power supply 20 for docking high impedance with a power source control signal (Step A20). With a Undock signal, the straw-man IDE device 22 operates an ejecting mechanism, and removes the connector 12 of the docking IDE device 14 from the connector 16 (Step A21).

[0034]Next, operation of three switches inside [straw-man IDE device 22] this invention is explained in detail with reference to drawing 6. Drawing 6 is a figure showing the switching operation of the switch of the straw-man IDE device of this invention. It is defined as what setting out from which as for the switching operation of three switches of the straw-man IDE device 22 or two serve as OFF simultaneous among the switches 32, 34, and 36 does not have here. Setting out of all [or] simultaneously set to ON two is used.

[0035]In switch 32=ON, switch 34=OFF, and switch 36=ON, a register and the controlling circuit part 38 are connected via the IDE bus for docking, and an internal bus. This state is the internal bus connecting operation of the straw-man IDE device 22 in the case of publishing the head evacuation command to the docking IDE device 14 just before HOTTOAN dock, when writing in initial setting to the docking IDE device 14 just behind a hot dog.

[0036]In switch 32=OFF, switch 34=ON, and switch 36=ON, a register and the controlling circuit part 38 are connected via an IDE bus and an internal bus. This state is the internal bus connecting operation of the straw-man IDE device 22 in case the docking IDE device 14 is not mounted.

[0037]In switch 32=ON, switch 34=ON, and switch 36=OFF, the IDE bus for docking is connected via an IDE bus and an internal bus. This state is the internal bus connecting operation of the straw-man IDE device 22 in case the docking IDE device 14 is mounted.

[0038]In switch 32=ON, switch 34=ON, and switch 36=ON, the IDE bus for docking is connected with a register and the controlling circuit part 38 via an IDE bus and an internal bus. This state carries out power supply ON, where the docking IDE device 14 is mounted, and it is the internal

bus connecting operation at the time of initial setting to the docking IDE device 14. At this time, a register and the controlling circuit part 38 receive only writing operation.

[0039]Next, other examples of this invention are described in detail with reference to drawing 7. Drawing 7 is a block diagram showing the composition of other examples of the IDE device insert-and-remove device of this invention. The docking device 40 is provided with the following as an example here.

Floppy disk drive 42.

It is newly the ID circuit 44.

[0040]The ID circuit 44 stores information, including the kind of device for the straw-man IDE device 22 to enable recognition of what kind of docking device connected, a name, a vendor name, etc. The straw-man IDE device 22 can be identified even when devices other than an IDE device enter using the information stored in the ID circuit 44. Thereby, the hot dog HOTTOAN dock of devices other than IDE can be supported now.

[0041]When the hot dog of the docking device 40 is carried out, the straw-man IDE device 22 identifies the kind of docking device with the ID signal which includes the serial signal of information, including the kind of device, a name, a vendor name, etc., using the information on the ID circuit 44. A serial bus etc. are used for an ID signal. The straw-man IDE device 22 connects the bus for docking, and a floppy disk bus, when the device by which the hot dog was carried out is the floppy disk drive 42. The floppy disk controller 46 becomes accessible to the floppy disk drive 42.

[0042]When the initialized value corresponding to various devices is needed, ROM48 is prepared and the initialized value required for each device is beforehand prepared in ROM48. The straw-man IDE device 22 reads initial value data from ROM48 if needed, and sets it to the docking device 40.

[0043]Next, the example of further others of this invention is described in detail with reference to drawing 8. Drawing 8 is a block diagram showing the composition of the example of further others of the IDE device insert-and-remove device of this invention. It is possible to use two or more straw-man IDE devices 22 by one system. Drawing 8 shows the case where the straw-man IDE device 22 is mounted also in a secondary IDE bus. The hot dog or HOTTOAN dock of a docking IDE device which is simultaneously different by this as for two can be supported. The number of the straw-man IDE device 22 can be used as the same as the number of the greatest IDE device controllable with IDE controller 28.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is a block diagram showing the composition of the IDE device insert-and-remove device of this invention.

[Drawing 2] It is a block diagram showing the composition of the straw-man IDE device of this invention.

[Drawing 3] It is 1 of **** showing the flow chart of operation of the IDE device insert-and-remove device of this invention.

[Drawing 4] It is 2 of **** showing the flow chart of operation of the IDE device insert-and-remove device of this invention.

[Drawing 5] It is 3 of **** showing the flow chart of operation of the IDE device insert-and-remove device of this invention.

[Drawing 6] It is a figure showing the switching operation of the switch of the straw-man IDE device of this invention.

[Drawing 7] It is a block diagram showing the composition of other examples of the IDE device insert-and-remove device of this invention.

[Drawing 8] It is a block diagram showing the composition of the example of further others of the IDE device insert-and-remove device of this invention.

[Drawing 9] It is a block diagram showing the composition of the conventional insert-and-remove control system.

[Description of Notations]

- 10 Slave IDE device
- 12 Connector
- 14 Docking IDE device
- 16 Connector
- 18 Information processor
- 20 The power supply circuit for docking
- 22 Straw-man IDE device
- 24 Ejecting switch
- 26 Ejecting mechanism
- 28 IDE controller
- 30 Master IDE device
- 32 Switch
- 34 Switch
- 36 Switch
- 38 A register and a controlling circuit part
- 40 Docking device
- 42 Floppy disk drive
- 44 ID circuit
- 46 Floppy disk controller
- 48 ROM

[Translation done.]

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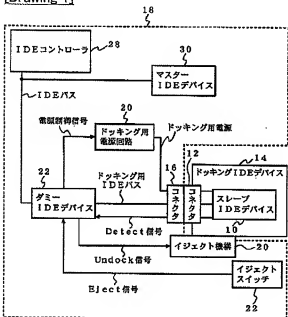
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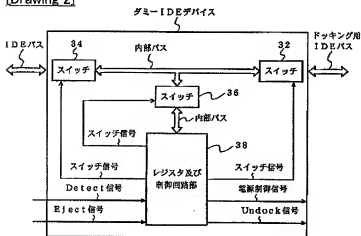
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DRAWINGS

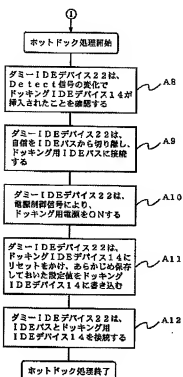
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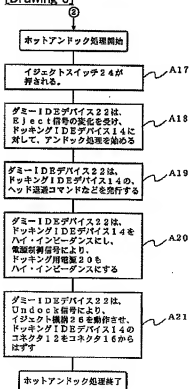
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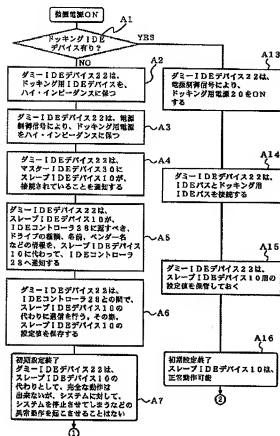
[Drawing 4]



[Drawing 5]



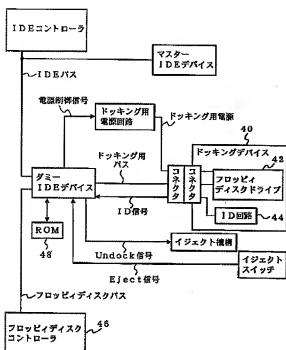
[Drawing 3]



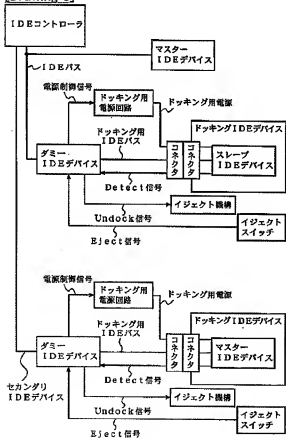
[Drawing 6]

スイッチ 32	スイッチ 34	スイッチ 35	デバイス間のバス接続	条件
OFF	OFF	OFF	未定義	なし
OFF	OFF	ON	未定義	なし
ON	OFF	OFF	未定義	なし
ON	OFF	ON	ドミーIDEデバイス⇔ ドッキングIDEデバイス	ホットドック直後のドッキングIDE デバイスへの初期設定時、もしくは、 ホットアンドドック直後のドッキング IDEデバイスへのヘッド認識コマ ンド実行時、
OFF	ON	OFF	未定義	なし
OFF	ON	ON	IDEコントローラ⇔ ドミーIDEデバイス	ドッキングIDEデバイスがない時、
ON	ON	OFF	IDEコントローラ⇔ ドッキングIDEデバイス	ドッキングIDEデバイスがあり、 通常動作時、
ON	ON	ON	IDEコントローラ⇔ ドッキングIDEデバイス、 ドミーIDEデバイス (書き込みのみ)	ドッキングIDEデバイスが実施され た状態で電源ONし、ドッキングIDE デバイスへの初期設定時、 (ドミーIDEデバイスへは、書き込 みのみ行われる)

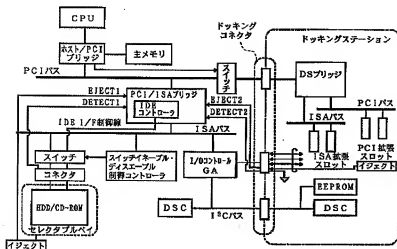
[Drawing 7]



[Drawing 8]



[Drawing 9]



[Translation done.]

* NOTICES *

JPO and INPIT are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.*** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

WRITTEN AMENDMENT

[Written amendment]

[Filing date]October 29 (1999.10.29), Heisei 11

[Amendment 1]

[Document to be Amended]Specification

[Item(s) to be Amended]Claim

[Method of Amendment]Change

[Proposed Amendment]

[Claim(s)]

[Claim 1]A docking IDE device which has a device which has a processing unit and/or memory storage, and the 1st connector for connecting said device to a device, It has the 2nd connector for connecting via the 1st connector of said docking IDE device, A power supply is supplied, when existence of said docking device is detected and said docking IDE device is connected, Said docking IDE device is connected to a bus which makes master slave connection, An IDE device insert-and-remove device provided with an information processor which outputs a signal of a straw man when said docking IDE device was removed with directions, as if there was said docking IDE device to a control system.

[Claim 2]A power supply circuit for docking where said information processor will supply or stop a power supply with a signal of current supply if said docking IDE device is connected, An ejecting means which will remove said 1st connector from said 2nd connector if a signal of removal will be outputted if directions of removal of said docking IDE device are received, and a signal of removal permission is acquired, Detect connection of said docking IDE device, and when having connected, a signal of said current supply is outputted, If masterslave connection of said docking IDE device and the IDE bus is made and a signal of said removal is inputted from said ejecting means, Cut said docking IDE device and an IDE bus, output a signal of said current supply, and a power supply is stopped, The IDE device insert-and-remove device according to claim 1 outputting said removal enabling signal and having said power supply circuit for docking, and a straw-man IDE device which maintains an IDE bus by the side of said docking IDE device at a hi-z state.

[Claim 3]The IDE device insert-and-remove device according to claim 1 or 2, wherein said docking IDE devices are a hard disk, CD-ROM, a buffer, and a control circuit.

[Claim 4]Said straw-man IDE device,

The 1st switch that switches an IDE bus by the side of said docking IDE device, and the 1st internal bus of said straw-man IDE device with the 1st switch signal,

The 2nd switch that switches said 1st internal bus and said IDE bus with the 2nd switch signal,

The 3rd switch that switches said 1st internal bus and the 2nd internal bus with the 3rd switch signal,

Output said 1st, 2nd, or 3rd switch signal, and a signal which detects existence of connection of said docking IDE device is inputted, The IDE device insert-and-remove device according to claim 2 having a register and a controlling circuit part which store individual information of said docking IDE device, input a signal of said removal, and output a signal of said current supply, and a signal of said removal permission.

[Claim 5] The IDE device insert-and-remove device according to claim 4 having further a memory measure which stores said individual information in said docking IDE device when said device stored in said docking IDE device is a device which does not have said of a device's own individual information at least.

[Claim 6] The IDE device insert-and-remove device according to claim 4 or 5, wherein said individual information is a kind, a name, and a vendor name.

[Claim 7] The IDE device insert-and-remove device according to claim 1, 2, 3, 4, or 5, wherein more than one connect with a bus by making masterslave connection of said information treating apparatus and said docking IDE device.

[Claim 8] A docking IDE device which has a device which stores a processing unit and a method and/or memory storage, and a method,

It is the IDE device insert-and-remove method that an IDE device insert-and-remove device provided with an information processor which connects said docking IDE device and has a supply source of a power supply to said docking IDE device and a bus which leads to a control system can be set,

A power supply is supplied, when existence of said docking device is detected and said docking IDE device is connected, An IDE device insert-and-remove method outputting a signal of a straw man when said docking IDE device which makes master slave connection was connected to said bus and said docking IDE device was removed with directions, as if there was said docking IDE device to said control system.

[Translation done.]